**AM-1 Mission Daily Operations Confidence Test - EGS3**

Test Objectives:

The objective of this test is to perform all of the normal daily operations of the EGS in support of the AM-1 Mission. This includes exercising the real time command and control of the spacecraft in the EOC, while simultaneously conducting mission planning and scheduling processing for future activities and spacecraft analysis processing on history data. Reception and storage of raw instrument data at EDOS and generation and archival of corresponding L0 data will be verified. EDOS will also generate the expedited data for ingest by the DAACs. At the DAACs, Level 0 and expedited data are received from EDOS, and ancillary data are transferred across DAACs, from ADCs and other sources. Generation of higher level products at the DAACs is scheduled using a "day in the life at DAAC" scenario based on the expected delivery schedule of L0 data from all AM-1 instruments. ASTER product generation will be verified using ASTER Level 1 data tapes received from ASTER GDS. MODIS data product generation at EDC and NSIDC will also verify timely availability of MODIS Level 2 products from GSFC. All the PGEs allocated for the release are run concurrently, according to schedule and the products are archived. Science user access to the ECS and data distribution functions will be verified concurrent with other functions specified above. The certification test is conducted at all DAACs concurrently. This test is the final step in the EOSDIS Mission Certification process for the AM-1 mission.

Requirements to be Verified:

N/A: All EGS I&T requirements verification will have been completed in preceding tests when this test is executed. The intent of this test is to provide a final, full up system functional demonstration in the operational environment.

Test Configuration:

**TBS**

Major components:

ECS Flight Operations Segment, Release B
ECS SCDO Release (**TBD**)
EDOS Capability 1 (C1)
EBnet Release (**TBD**)

Participants and Support Requirements:

Participants:

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|---|---|
| AM1 Flight Operations Team | Operate EOC systems in pre-test activities and during the test to produce the required mission timeline and supporting command loads. Perform real time command and control portions, collect and archive telemetry, commands and events for post test analysis as required. |
| EGS Integration and Test | Produce Test Package, coordinate the generation or collection of necessary test data, coordinate scheduling and execution of the test, witness execution and write quick look and final test reports |
| Space Network NCC | Provide NCC Test System to provide exercise of scheduling interface during pre-test activities and real time control interface (GCMRs and UPD) during test execution. |
| Flight Dynamics Division | Provide developer and operations consulting support for the operation of the Flight Dynamics Support Systems. |
| EBnet | Provide network support as required. |
| EDOS | Provide EDOS operations during test execution. |
| DAACS | Operations for production processing, and archiving |
| Instrument Operations Teams | Operations for instrument activity scheduling in pre-test activities, real time command and telemetry monitoring, analysis activities via the IST's. |

Instrument Science Teams — Support for science production processing (algorithm support), search and access data archives locally and remotely as science users.

Communications:

All data and voice communications will be through the normal operational circuits provided by EBnet, NASCOM and NISN.

Equipment and Software:

As for EGS AM1 Launch Configuration

Test Tools:

First choice: Use AM1 Spacecraft Simulator (SSIM) for AM1 telemetry source and command sink. Use ETS HRS as science data source.

Second choice: Use ETS/MPS for AM1 telemetry source and command sink. Use ETS HRS as science data source.

Test Data:

| Description / Characteristics | Source | File/script name & Location |
|---|---|---|
| Housekeeping telemetry<br>(nominal 16kbps HK stream) | AM1 SSIM or<br>ETS / MPS | ETS: scenario file**rthk.scn** |
| Health and Safety Telemetry<br>(nominal 1kbps HS stream) | AM1 SSIM or<br>ETS / MPS | ETS: scenario file**rths.scn** |
| RTCS Load<br>RTCS to execute at next orbit day/night crossing | EOC (generated in pre-test phase) | (RTCS #1) |
| SCC Data Table<br>(Type **TBD**) | EOC (generated in pre-test phase) | (SCC #1) |
| SSR Dump Data - representative science data in all instrument buffers. No quick-look flags set.<br>HK buffer with stored telemetry overlapping real time data produced by SSIM / ETS. | ETS / HRS | (Science Data Set #1) |
| ASTER Data Table<br>(Type **TBD**) | ASTER GDS (generated in pre-test phase) | (SCC #2) |
| CERES microprocessor data table | CERES IST (generated in pre-test phase) | (CERES #1) |

| Description / Characteristics | Source | File/script name & Location |
|---|---|---|
| ATCS Load | EOC (generated in pre-test phase) | (ATCS #1) |
| SSR Dump Data - representative science data in all instrument buffers.<br>ASTER quick-look flag set.<br>HK buffer with stored telemetry overlapping real time data produced by SSIM / ETS. | ETS / HRS | (Science Data Set #2) |
| RTCS Load<br>RTCS load to execute at next ZOE entry | EOC (generated in pre-test phase) | (RTCS #2) |
| MODIS microprocessor FSW update | MODIS IT via MODIS IST | (MODIS #1) |
| SCC FSW update | SDVF (transferred to EOC in pre-test phase) | (SCC #3) |
| SSR Dump Data - representative science data in all instrument buffers.<br>No quick-look flags set.<br>HK buffer with stored telemetry overlapping real time data produced by SSIM / ETS. | ETS / HRS | (Science Data Set #3) |
| SSR Dump Data - representative science data in all instrument buffers.<br>MOPITT quick-look flag set.<br>HK buffer with stored telemetry overlapping real time data produced by SSIM / ETS. | ETS / HRS | (Science Data Set #4) |
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Test Case Descriptions:

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|---|---|---|
| Prerequisites: | AM-1 Spacecraft Daily Operations Test | EGS1 |
| | Data Ingest and Archive Confidence Test | SFQ1 |
| | Science Data Production Confidence Test | SFQ2 |
| | Data Access and Transfer Confidence Test | SFQ3 |

## EGS3.1 AM-1 Mission Daily Operations Test.

This test will be planned for a 12 hour execution and split into three phases, a pre-test phase, an execution phase and a post-execution phase.

**Pre-test phase:**

The objective of the pre-test phase will be to produce the Mission Timeline, Ground Script, and supporting command and memory loads for the execution phase. The execution phase will be built around 10 TDRSS contacts as described below. Activities other than those listed may be scheduled as a result if inputs made by the instrument operations teams in the pre-test phase. The intent is to provide a "free play" planning and scheduling phase and then execute the resulting ground script against the AM1 Spacecraft Simulator.

| No. | Time (relative to test start) | Activities scheduled |
|---|---|---|
| 1 | 00:00 - 00:15 | Real time commanding<br>Housekeeping Telemetry processing<br>Load RTCS to execute at next orbit night crossing (RTCS #1)<br>Dump and compare RTCS load<br>Load SCC Data Table (SCC#1)<br>Dump and compare SCC#1 |
| 2 | 01:15 - 01:30 | Real time commanding - Accept real time command requests from ASTER ICC<br>Housekeeping telemetry processing<br>Perform RDD spacecraft clock correlation<br>Dump SSR (Science Data Set #1 - all instrument buffers and HK buffer - No quick look flags)<br>Load ASTER Data Table to SCC (SCC # 2)<br>Dump and compare SCC #2 |
| 3 | 02:30 - 02:45 | Real time commanding<br>Housekeeping telemetry processing<br>Real time attitude determination with FDS<br>Load CERES micro-processor data table (CERES #1)<br>Dump and Compare CERES #1 |
| 4 | 03:45 - 04:00 | Real time commanding - In SAFE mode on contact - GCMR to 1 kbps, perform LOCKOUT recovery, perform safe mode recovery<br>Health and Safety telemetry processing |

| No. | Time (relative to test start) | Activities scheduled |
|---|---|---|
| 5 | 05:00 - 05:15 | Real time commanding - Accept real time command requests from MODIS IST.<br>Housekeeping telemetry processing<br>Load ATCS Load to execute at (06:20 relative to test start time) - ATCS #1 - ASTER calibration activity)<br>Dump and compare ATCS #1 |
| 6 | 06:15 - 06:30 | Real time commanding<br>Housekeeping telemetry processing - Monitor execution of ATCS #1<br>Dump SSR (Science Data Set #2 - all instrument buffers and HK buffer - ASTER quick look flag set) |
| 7 | 07:30 - 07:45 | Real time commanding<br>Housekeeping telemetry processing<br>Load RTCS to execute at next ZOE entry (RTCS #2)<br>Load MODIS microprocessor FSW update. (MODIS #1)<br>Dump and compare RTCS #2<br>Dump and compare MODIS #1 |
| 8 | 08:45 - 09:00 | Real time commanding - Accept real time command requests from CERES IST.<br>Housekeeping telemetry processing<br>Load CERES microprocessor data table (CERES #1)<br>Dump SSR (Science Data Set #3 - all instrument buffers and HK buffer - No quick look flags) |
| 9 | 10:00 - 10:15 | Real time commanding<br>Housekeeping telemetry processing<br>Load SCC FSW update (SCC #3)<br>Dump and compare SCC # 3 |
| 10 | 11:15 - 11:30 | Real time commanding - accept real time command requests from MOPITT IST.<br>Housekeeping telemetry processing<br>Dump SSR (Science Data Set #4 - all instrument buffers and HK buffer - MOPITT quick look flag set) |
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The pre-test phase will begin in the SN forecast scheduling period (3 weeks prior to the scheduled execution date). The FDS workstations will provide the planning aids necessary to support the activity scheduling from the FOT in the EOC and the instrument teams via the ICC*I*ST's.

**Execution Phase:**

In the execution phase the activities scheduled in the Ground Script are executed as they would be in normal operations. Additionally, future planning and scheduling, analysis, and training activities are executed simultaneously, as would be the case in normal operations. These are "free play" activities, as in the pre-test phase. The execution timeline is as follows:

| Event | Time (relative to start) | Description |
|---|---|---|
| 1 | 00:00 - 00:15 | Real time contact 1 |
| 2 | 01:15 - 01:30 | Real time contact 2 |
| 3 | 01:35 - 02:00 | Merge real time telemetry archive and HK buffer dump from Real time contact 2. |
| 4 | 02:00 - 07:00 | Conduct "free play' planning and scheduling activities:<br>FDS makes planning aids available<br>FOT schedules SC bus activities<br>Instrument teams schedule instrument activities via ICCT's<br>Conflict resolution and constrain checking<br>Timeline generation |
| 5 | 02:30 - 02:45 | Real time contact 3 |
| 6 | 03:00 - 07:00 | Conduct a PDB validation and ODF generation on the support LAN systems. |
| 7 | 03:45 - 04:00 | Real time contact 4 |
| 8 | 05:00 - 05:15 | Real time contact 5 |
| 9 | 05:00 - 08:00 | Submit and process representative set of analysis requests - at least one for each sub-system, various filtering and statistics requested, and at least one that requires retrieval of archived telemetry data from the GSFC DAAC. |
| 10 | 06:15 - 06:30 | Real time contact 6 |
| 11 | 06:45 - 07:15 | Merge real time telemetry archive and HK buffer dump from SSR dump in real time contact 6 |
| 12 | 07:00 - 09:00 | Conduct 2 hours of FOT training using the packet generator as a data source on the support LAN systems. |
| 13 | 07:30 - 07:45 | Real time contact 7 |
| 14 | 07:30 - 08:30 | Submit TDRSS scheduling requests generated during the planning and scheduling activities (Event 4) to the NCC. |
| 15 | 08:45 - 09:00 | Real time contact 8 |
| 16 | 09:00 - 11:00 | Generate the loads to support the mission timeline generated in Event 4 |
| 17 | 09:15 - 09:45 | |

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|---|---|---|
| 19 | 11:15 - 11:30 | Real time contact 10 |
| 20 | 11:30 - 12:00 | Merge real time telemetry archive and HK buffer dump from SSR dump in real time contact 10. |
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**Post-Test Phase:**

The post-test phase actually overlaps with the Execution Phase in that it starts with the processing of the first science data downlink (Event 3). Science data sets downlinked in the execution phase are Level 0 processed at the EDOS LZPF and transferred to the appropriate DAAC. Ancillary data will be ingested as necessary to complete production processing. PGE's at the DAACs are scheduled and executed to product the higher level products associated with the science data. These products are quality checked and archived upon completion and advertised via the Advertising Service. Instrument Science Teams at the SCFs search for and access data sets of interest at the local DAAC and at remote DAACs. There will be at least one exercise involving dependency processing, i.e., retrieval of a precursor product from a remote DAAC and generation of the dependent product.

Test Procedures:

Test procedures for this test consist of timeline driven directions to Test Tool / Data Source operators to begin flowing the specified data. All system operations are conducted by the normal operations staff in accordance with approved operational documentation. The test will be controlled over SCAMA / CCL voice circuits by the test director in the EOC.

| Event | Time (relative to start | Stations | Activity |
|---|---|---|---|
| 0 | - 0:10 | ALL | Test conductor conducts pre-test briefing over SCAMA/CCL |
| 1 | 0:00 | SSIM | real time contact #1<br>Flow HK telemetry at 16kbps, recording to SSR |
| 2 | 01:15 | SSIM | real time contact #2<br>Flow HK telemetry at 16kbps, recording to SSR |
| | | HRS | Flow Science Data Set #1 to EDOS LZPF in response to SSR dump command from EOC. |
| 3 | 01:35 | EDOS<br>EOC | Playback telemetry processing |
| 4 | 02:00 | EOC<br>ICC/IST | Begin planning and scheduling activities |
| 5 | 02:30 | SSIM | real time contact #3<br>Flow HK telemetry at 16kbps, recording to SSR |
| 6 | 03:00 | EOC | Begin PDB validation and ODF generation |
| | | SSIM | Reconfigure the SSM to be flowing 1kbps H&S telemetry and showing state table values indicating SAFE MODE operation. |
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